

# **Measuring Special Education Preservice Teachers' Knowledge, Reflective Ability, and Tutored Student Outcomes on Foundational Literacy Skills**

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*Professional organizations, researchers, and teacher educators have all highlighted the need for teachers to have deep, extensive, and flexible knowledge about teaching foundational skills (i.e., phonological awareness, phonics, and spelling) to beginning readers and students with a learning disability in word-level reading and for teacher preparation programs to be instrumental in building this knowledge base. In this study, special education preservice teacher knowledge and perceptions about foundational skills were assessed before and after a semester-long literacy course with connected fieldwork (i.e., tutoring) as well as their reflective ability. Special education preservice teachers' knowledge scores were significantly higher from pre-to post-test, and significantly different when compared to peers in a general education literacy course. Special education preservice teachers' post-test scores on foundational skills also predicted over half (i.e., 51%) of the variance in elementary student standard score growth on a norm-referenced measure. Reflective ability was not a significant predictor of elementary student growth and decreased over time.*

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## **INTRODUCTION**

Teaching children to read is a complex endeavor and has been noted as a job for an expert (Moats, 1999; Snow et al., 2005). For individuals with a reading-related learning disability (LD), teacher expertise is all the more crucial

(Moats, 2014). Professional organizations that guide the preparation of educators to teach reading (i.e., International Dyslexia Association [IDA]; International Literacy Association [ILA]) outlined standards requiring teachers to have extensive knowledge about facts, concepts, theories, and principles related to language and vocabulary development, foundational skills<sup>1</sup> (i.e., print concepts, phonological and phonemic awareness, phonics and word recognition, and fluency), and listening and text comprehension. In addition to strong reading-related content knowledge, researchers have reported that teachers need flexible pedagogical content knowledge (Shulman, 1987), or the ability to integrate and apply content knowledge, to teach reading to *all* children, but especially to those with an LD in word-level reading (Snow et al., 1999). We acknowledge the importance for teachers to possess knowledge across all components related to reading instruction. In this paper, we focused on knowledge of foundational skills.

Influential research syntheses on teaching young children to read such as the *National Reading Panel* (National Institute of Child Health and Human Development, 2000) and the What Works Clearinghouse report *Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade* (Foorman et al., 2016) reported the strong evidence-base for teaching children to recognize and manipulate segments of sound in speech (i.e., phonemic awareness) and how those sounds link to letters as well as how to use their letter-sound knowledge to decode words, analyze word parts, and write and recognize words (i.e., phonics and spelling). In addition, an explicit, systematic (i.e., direct, sequential and building upon previous skills) approach to teaching foundational skills is more beneficial for young, beginning readers as well as students with an LD in reading than a less direct approach (Foorman & Torgesen, 2001; Rupley et al., 2009; Snow & Juel, 2005).

Teacher content and pedagogical content knowledge of foundational skills, especially those related to the structure of the English language (i.e., phonological and phonemic awareness, phonics), is correlated with student literacy achievement (e.g., McCutchen et al., 2002; McCutchen et al., 2009; Moats & Foorman, 2003). Researchers noted teachers with stronger knowledge were more likely to engage in explicit reading instruction (e.g., Piasta et al., 2009). Moreover, this knowledge base is essential for teachers working with children with an LD in word-level reading (i.e., dyslexia), who are more likely to experience persistent difficulties with phonemic awareness and phonetic reading (IDA, 2018). Thus, teacher preparation has long been considered a key starting point to build reading-related content and pedagogical content knowledge and apply this in fieldwork experiences (Brady & Moats, 1997; Snow et al., 2005).

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1 Common Core State Standards (CCSS, 2010) define foundational skills as concepts and skills related to print concepts, phonological and phonemic awareness, phonics and word recognition, and fluency.

The current project was guided by teacher educators preparing general and special educators to teach children with diverse strengths and needs in reading. The purpose of this project was twofold. First, we examined special education (SE) preservice teachers' (PST) literacy-related content and pedagogical content knowledge and perceptions, in relation to their general education (GE) peers, before and after a literacy-related course and corresponding field-experience. Second, we examined the potential impact SE PSTs' knowledge had on elementary students' foundational literacy skills (i.e., phonological awareness, phonics skills). The SE PSTs engaged in field-based tutoring that required them to assess one elementary student receiving special education services for a mild to moderate disability (i.e., prekindergarten through fifth grade) and use data to design and implement targeted literacy instruction. We also examined SE PSTs' ability to reflect on their teaching experiences, referred to as reflective ability, in and across the context of their field-based tutoring and the relationship between SE PSTs' reflective ability and student achievement. Reflective ability is the ability to justify, evaluate, or extrapolate information from a previous teaching session in the context of a written reflection (e.g., Nagro, 2015).

### ***Special Education Preservice Teacher Knowledge***

PST literacy-related and pedagogical content knowledge has been examined for over three decades. Moats (1994) notably, published one of the first studies highlighting potential holes in teacher knowledge of foundational skills related to teaching beginning readers and students with an LD in word-level reading. Moats reported that the 89 participants (speech pathologists, graduate students, GE, and SE teachers) struggled to define terms, locate or give examples of phonic, syllabic, and morphemic units, and analyze words into speech sounds. Moreover, participants demonstrated limited knowledge terms associated with teaching reading (e.g., phonemic and morpheme awareness).

Researchers and educators have since assessed PST (Bos et al., 2001; Fenty & Uliassi, 2018; Washburn et al., 2011a), inservice teacher (Mather, Bos, & Babur, 2001; Moats & Foorman, 2004; Washburn et al., 2011b), and teacher educator (Binks-Cantrell et al., 2012) knowledge of foundational skills. In addition, some PSTs studies have surveyed special education PST knowledge before and after coursework focused on teaching reading to individuals with an LD (Kennedy et al., 2013; Sayeski et al., 2017). However, only a few researchers have investigated SE PST knowledge before and after coursework that is inclusive of tutoring an individual with an LD (e.g. Al Otaiba & Lake, 2007; Spear-Swerling, 2009; Spear-Swerling & Brucker, 2004; Spear-Swerling et al., 2005). For the purposes of this study, we focus our review on this latter group of studies in which SE PST knowledge was assessed with fieldwork.

**Explicit Instruction Matters.** Researchers reported that PSTs, regardless of the amount of literacy courses previously taken and/or their perceived

preparedness to teach literacy, generally lack content knowledge needed to teach beginning readers and students with an LD in word-level reading (Meeks et al., 2017). However, researchers also reported that coursework that has an explicit and extended emphasis on building knowledge about the phonological and phonetic structure of the English language can positively impact PST knowledge. Spear-Swerling and colleagues, in a series of studies with SE PSTs (Spear-Swerling & Brucker, 2003, 2004; Spear-Swerling et al., 2005; Spear-Swerling, 2009), found that content knowledge and application thereof is positively impacted by direct and explicit instruction of foundational skills related concepts. For example, Spear-Swerling and Brucker (2003) examined the effect of direct instruction of word structure, or “the phonological structure of words and common orthographic patterns in English” (p. 72), on SE PST knowledge. Ninety PSTs that were divided into three separate courses participated in this study. Two of the PST groups received direct instruction and the third group served as the comparison and did not receive any instruction. Moreover, one of the instructional groups was involved in a supervised tutoring program. Prior preparation, such as certifications or specific training courses (e.g., Orton-Gillingham), and prior experience (e.g., tutoring, teacher’s aide) were noted. To assess knowledge, a pre- and post-test of word-knowledge, required PSTs to segment words, classify pseudowords according to syllable type, and detect irregular words. Results from the pre-test and post-test indicated that students with prior preparation outperformed those who did not on two of three tasks; however, prior experience was not a significant predictor. Though students with prior preparation scored significantly higher, neither groups’ scores were very high, particularly on the detection of irregular words. Results from this study suggested that though students in instructional groups made gains, one instructional time period in word structure is not enough, instruction as well as an opportunity to practice knowledge is needed beginning in preservice preparation and on-going through inservice professional development.

**Application of Content Knowledge is Key.** In addition to direct, explicit, and extended instruction, researchers reported that PST participation in tutoring that mirrors the application of the learned content may also increase PST knowledge and skill related to teaching beginning reading (Al Otaiba & Lake, 2007; Al Otaiba et al., 2012; Spear-Swerling & Brucker, 2004; Spear-Swerling, 2009). Al Otaiba and colleagues reported that SE and GE PSTs’ knowledge increased with targeted coursework and participation in ongoing tutoring. For example, Al Otaiba and Lake (2007) examined the impact a semester-long course focused on teaching elementary-aged students with reading difficulties had on SE PST knowledge and their corresponding tutee’s reading achievement. PSTs’ knowledge increased significantly as did all but two of the tutees’ post-tutoring scores on word identification and word attack. Al Otaiba and Lake also reported

that children who were tutored by PSTs made gains in their reading fluency. Additionally, PSTs who used a code-explicit approach to tutoring, in contrast to those who engaged in a more meaning-focused approach, noted in their weekly post-tutoring reflections a greater awareness and ability to use curriculum-based measures (CBMs) to help inform weekly tutoring instruction. Similar findings were reported by Al Otaiba et al. (2012) in which early childhood GE PSTs' knowledge was measured before and after a clinical course in which they worked with a young child using either a code-explicit, scripted or a meaning-focused tutoring program. Though not specific to SE PSTs, it is noteworthy that Al Otaiba and colleagues reported that all PSTs, regardless of tutoring program, demonstrated similar gains in knowledge but those engaged in the code-explicit approach had higher ratings of perceived ability to teach reading and their tutees made greater gains in decoding.

Spear-Swerling and colleagues also investigated SE PST knowledge in the context of a clinical course in which PSTs engaged in assessing and tutoring a struggling literacy learner (Spear-Swerling & Brucker, 2004; Spear-Swerling, 2009). PSTs' assessed their tutees' phonics/decoding, spelling, and reading comprehension and taught six lessons that incorporated those skills. In both studies, PST knowledge was assessed before and after the clinical course as were the foundational skills of the tutored literacy learners. Spear-Swerling and Brucker (2004) reported that PST knowledge of foundational skills grew from the beginning of the course to the end and was related to their tutees' post-tutoring scores on measures of phonics, reading, and spelling. And though Spear-Swerling (2009) reported that PST knowledge of foundational skills grew significantly, she also noted that knowledge scores did not predict tutees' post-tutoring scores. Though PSTs' knowledge increased in each of the studies discussed, knowledge scores were not at ceiling and Spear-Swerling reiterated that one course focused on teaching the science of reading is not enough and noted that, "teacher educators must give careful consideration to the most essential content and skills to be developed at the preservice level, with opportunities for ongoing, high-quality professional development at the in-service level" (p. 441).

This body of research directly informed the current study. We acknowledge that direct instruction of content and opportunities to apply content knowledge with children are important and valued practices in SE teacher education (McLeskey & Brownell, 2015; Leko et al., 2015). However, given the small number of published research studies on this topic, there is room for continued examination of these practices on the potential impact that this approach to teacher education may have on SE PST content and pedagogical content knowledge. The purpose of the present study was to examine SE PST content and pedagogical content knowledge about foundational skills (i.e., phonological awareness, phonics skills), their perceptions about their knowledge before

and after literacy-related coursework, and the potential impact on elementary students' foundational literacy skills.

### ***Research Questions***

The following research questions guided the study: (a) How do SE PSTs' knowledge and perceptions change over time when compared to GE PSTs? (b) Do PSTs' post-test knowledge scores predict gain in elementary students' foundational skills on standardized, norm-referenced measures? (c) Does SE PSTs' reflective ability change over time? If so, how? and (d) Does SE PSTs' reflective ability predict SE PSTs' knowledge gain and/or elementary student standard score gains?

The first two questions were posed as the primary purpose for investigation. A secondary purpose of this study was to explore the incorporation of written reflection as part of SE PSTs' tutoring fieldwork and lesson planning and if reflective ability predicted knowledge and/or tutored student performance.

### **METHOD**

The present study followed SE PSTs ( $n = 12$ ) throughout their second literacy course while they learned to teach students with a disability how to read. SE PSTs were assessed on foundational skills (phonemic awareness, phonics), recall of the NRP's five research-based components for reading instruction (phonemic awareness, phonics, fluency, vocabulary, comprehension), and their knowledge of dyslexia at the beginning and ending of the semester. During the second half of the course, SE PSTs tutored one elementary student identified with a disability in foundational reading skills. These elementary students were assessed on norm-referenced measures (i.e., Kaufman Test of Educational Achievement, third edition [KTEA-III] Kaufman & Kaufman, 2014) before and after tutoring and on standardized diagnostic measures (i.e., CORE surveys). SE PSTs wrote reflections after each week of tutoring that were coded for reflective ability. A comparison group of GE PSTs ( $n = 13$ ) taking their final literacy methods course were also assessed at the beginning and ending of the semester.

### ***Participants***

All participants were undergraduate students enrolled in a teacher preparation program at a southwestern land grant university. According to the required course sequence, all SE and GE PSTs had previously completed a three-credit-hour GE elementary literacy course focused on beginning reading skills while concurrently enrolled in a one-credit-hour one-on-one practicum component concurrently. The previously completed practicum was designed to allow students to tutor a second grade GE student in a one-on-one setting and apply knowledge and skills learned concurrently from the GE elementary literacy course (see supplemental files).

**Special Education Preservice Teachers.** Undergraduate PSTs ( $n = 12$ ) majoring in SE for mild to moderate disabilities and enrolled in a SE literacy and language course consented to participate in the study. A field-based introductory practicum course was taken concurrently and required 200 hours of experience in an elementary SE setting. Elementary students receiving special education services were recruited to participate from SE PSTs' practicum settings. Table 1 provides an overview of each PST and their tutored student along with assessments that were collected on each tutored student.

**Table 1. *Special Education Preservice Teachers and Matched Elementary Student Information***

SE PST	Elementary student grade level	KTEA-III scores collected	CORE scores collected
1	3rd	Yes	Yes
2	2nd	Yes	Yes
3	5th	Yes	Yes
4	2nd	No*	Yes
5	3rd	Yes	Yes
6	2nd	Yes	Yes
7	3rd	Yes	Yes
8	2nd	Yes	Yes
9	3rd	Yes	Yes
10	PreK	No*	Yes
11	2nd	Yes	Yes
12	None**		

*Note.* \*Child was unable to take KTEA-III due to scheduling conflicts. \*\*Due to a late change in fieldwork placement (i.e., the initial cooperating field teacher was no longer able to mentor a SE PST), SE PST 12 was unable to collect student scores.

**Elementary General Education Preservice Teachers.** As a comparison group, elementary GE PSTs (first through eighth grade) completed the Survey of Reading-Related Knowledge and Perceptions at the beginning and ending of a children's literature and writing course. Thirteen GE PSTs consented to participate. This was the final course in their literacy sequence taken the semester



immediately preceding student teaching. During this course, GE PSTs were in an elementary setting two full days a week as part of their practicum experience.

**Tutored Students.** A total of 11 tutored students consented to participate. Ten participating students were in 2<sup>nd</sup> through 5<sup>th</sup> grade and received pull-out SE services with an annual goal in their Individualized Education Program (IEP) related to reading. One student was in prekindergarten and received services in a self-contained prekindergarten setting for students identified with a developmental delay. Students were located in elementary (grades pre-kindergarten through fifth) or intermediate (grades third through fifth) settings in various districts near the university. Although some recruited students were in the same school, were receiving SE services from the same SE cooperating teacher.

### ***Procedures and Measures***

To ensure the acquisition of knowledge, behaviors, and skills associated with the coursework described below, the first author engaged in explicit and systematic instruction when delivering course content. This was accomplished through a variety of modalities and based on the recommendations of Archer and Hughes (2010), including: (a) modeling of evidence-based practices when working with students, (b) the delivery of assignments through gradual release of responsibility (i.e., chunking and scaffolding), (c) the distribution of practice over the course of the 16 weeks, (d) readings that matched in-classroom instruction, (e) assignments that allowed for demonstration of PSTs' knowledge, and (f) positive and corrective feedback from the instructor.

**GE Coursework.** PSTs attaining their GE elementary certification (i.e., the comparison group), received instruction in a literacy methods course in which content was focused on children's literature and writing. The purpose of the GE literacy methods course was to provide GE PSTs with the knowledge and skills needed to provide writing instruction in the elementary classroom environment and use children's literature as a tool for language and literacy development and writing instruction. The required textbooks included (a) *Mentor texts: Teaching writing through children's literature, K-6* (2<sup>nd</sup> ed.; Dorfman & Cappelli, 2017), (b) *The Writing Revolution: A Guide to Advancing Thinking through Writing in All Subjects and Grades* (Hochman & Wexler, 2017), and (c) *Essentials of Children's Literature* (9<sup>th</sup> ed.; Short et al., 2017). Course objectives included understanding (a) different genres of children's literature, (b) how to use children's literature during writing instruction, (c) the writing process and how to help students negotiate the process, (d) how to organize the writing workshop classroom to support writing across the curriculum, (e) traits of writing for assessment and instruction, (f) how to integrate writing across the curriculum to support learning, and (f) how to develop, assess, and extend children's poetic, narrative, information, and opinion writing across the disciplines. This course



was taken the semester prior to internship. No PSTs in this group had previously taken the SE language and literacy course.

**SE PST Coursework.** SE PSTs received 7 weeks of face-to-face instruction before beginning one-on-one tutoring. These classes focused on reading development, assessment, alphabet knowledge, phonemic awareness, grapheme-phoneme correspondences, phonics, irregular words, syllable types, spelling patterns. During the second half of the semester while tutoring was taking place, 6 weeks of instruction focused on handwriting, fluency, vocabulary, reading comprehension, morphology, and teaching ELL students and older students with reading difficulties. Before class each week, PSTs completed readings from *Multisensory Teaching of Basic Language Skills* (Birsh & Carreker, 2018) and activity pages from *Multisensory Teaching of Basic Language Skills Activity Book* (Carreker & Birsh, 2018) that corresponded to the topics to be discussed and practiced during class time. Participants also completed 1 week of online instruction during the second week of class in which they read a practitioner article describing the differences between structured literacy and typical classroom practices (Spear-Swerling, 2019) and discussed it in an online forum with guiding questions.

PSTs either created a flashcard deck or purchased one from a list of providers during the first week of class and practiced 70 of the most common English graphemes and common phonemes associated with each grapheme during this time. For example, “igh” was displayed on the front of a flashcard and “/ī/ -- long i” on the back with the keyword, “night”. Another card read, “ow,” on the front with two corresponding phonemes and keywords, /ow/ -- “how” and /ō/ -- “snow,” on the back. PSTs were instructed to graph their progress during each practice session to ensure adequate progress was made before being assessed orally by the instructor during the fourth week of class. All PSTs demonstrated mastery (95% or above) of the grapheme-phoneme correspondences before beginning *CORE* assessments with students during the fifth week.

During the third week of the course, PSTs were trained in how to administer assessments from *CORE Assessing Reading Multiple Measures* (Diamond & Thorsnes, 2018) including the *CORE Phoneme Segmentation Test*, the *CORE Phoneme Deletion Test*, the *CORE Phonics Survey*, and the *CORE Graded High-Frequency Word Survey*. This knowledge was used to determine the tutee’s starting point for instruction and to measure growth after tutoring commenced. Participants also received training in how to administer *Acadience Reading Oral Reading Fluency (ORF)* to progress monitor their tutee’s response to instruction. The PST assigned to tutor the prekindergarten student was trained in the *Acadience Reading First Sound Fluency (FSF)* assessment in addition to the other assessments.

During the fourth and fifth week of the course, the instructor trained the PSTs in the use of the *Flyleaf Publishing Emergent Reader Series* and *Decodable Literature Library*. Procedures for connecting and condensing the curriculum to the structured lesson plan format were also modeled during class. Tutoring began the seventh week of the course. See the supplemental files for an overview.

**SE Tutoring Requirements.** After SE PSTs demonstrated mastery of the grapheme-phoneme correspondences, they scheduled the first diagnostic assessment session with their elementary student receiving SE services. SE PSTs scheduled 12 tutoring sessions and three assessment sessions (two pre-assessment sessions and one post-assessment session) lasting approximately 30–40 min each. After they administered the initial assessments, each PST determined a starting point in the *Flyleaf Publishing Emergent Reader Series* and *Decodable Literature Library* by comparing the scope and sequence of the curriculum with the student's *CORE* assessment results. Feedback on the starting point was offered by the university instructor.

During weeks 7–12 of the course (i.e., tutoring sessions), SE PSTs turned in structured plans (see supplemental file) for the two sessions of tutoring each week and rehearsed in class with a peer using materials. Peers provided feedback on the lesson and the university instructor also circulated to answer questions, provide modeling, or offer corrective feedback during each section of the structured plan.

The structured plan included targeted instruction in phonemic awareness, phonics (i.e., grapheme-phoneme correspondences or phonics patterns, decoding, and word chains), spelling patterns (i.e., phoneme-grapheme mapping), high-frequency words (i.e., puzzle words), reading connected text (i.e., decodable reader), and if applicable, new vocabulary present in the decodable reader. At the end of each lesson, the SE PST administered a progress monitoring probe (*Acadience Reading ORF* or *FSF* for the prekindergarten student) to assist SE PSTs in reflecting on student progress. Each week, the university instructor provided feedback to SE PSTs through the online learning platform based on the completed lesson plans for the purpose of improving future planning.

After each tutoring session, SE PSTs reflected on the student's response to the intervention by listing observations and changes that should be made to future tutoring sessions. SE PSTs completed this reflection on each component of the plan and submitted it online within 48 hrs of the second tutoring session during each week. The instructor gave feedback via the online learning platform to SE PSTs on their reflection, including addressing any questions SE PSTs submitted to assist with future planning.

All SE PSTs completed between 10 and 12 tutoring sessions in addition to the assessment sessions with the elementary student throughout the semester. Sessions varied slightly between participants due to school absences or

state testing. After the final tutoring session, SE PSTs assessed their elementary student, using the same assessments from the initial assessment battery, to determine if the student's present level of performance differed from the results of the pre-assessment. The SE PSTs used this data to write a final assessment and growth report, reflecting on their own teaching experiences and growth as well as student reading growth throughout the semester. Feedback on the report was provided through the online system. As these reports were for the benefit of the SE PSTs reflection and growth, they were not given to the elementary students or their classroom teachers.

**Survey of Reading-Related Knowledge and Perceptions.** The third author presented PSTs with the opportunity to participate in this research during their first class period. SE and GE PSTs completed the Survey of Reading-Related Knowledge and Perceptions via Qualtrics before the second class period and again after the second-to-last class period. All PSTs received a completion grade for finishing the survey; however, only PSTs that had consented were included in the research. All SE PSTs ( $n = 12$ ) chose to participate and all but one GE PST ( $n = 13$ ) chose to participate in the study. The Survey of Reading-Related Knowledge and Perceptions contained 31 items and was adapted from Binks-Cantrell et al., 2012. Cronbach's  $\alpha$  of 0.73 at pre-test and 0.84 at post-test. Twenty-five items were designed to measure knowledge of foundational skills (phonological and phonemic awareness = 19 items, phonics and spelling = 16 items). Items related to foundational skills consisted of multiple choice and demonstrating skills (i.e., identification of speech sounds in a word). Five items assessed PSTs' perceived knowledge to teach various aspects of reading instruction and reading disability (i.e., phonological awareness, phonics, spelling, reading disability, and dyslexia). PSTs indicated their perceived knowledge using a Likert-type scale of one to four (i.e., minimal, moderate, very good, expert). This score was aggregated to measure PSTs' perceived knowledge. Five were adapted from previous research (Washburn et al., 2011b) regarding dyslexia. Each question had the options of true, false, and "I don't know." Scores were dichotomously coded as one or zero and aggregated to create the dyslexia knowledge score. The final, open-ended question asked participants to "List the components of reading instruction recommended by the National Reading Panel (National Institute of Child Health and Human Development, 2000)." Participants were instructed to type, "I don't know" if they could not identify any of the components. One point was given for each correct answer (i.e., phonemic awareness, phonics, fluency, vocabulary, reading comprehension) and aggregated to create the NRP Big five knowledge score.

**Tutored Students' Measures of Reading Performance.** The first and third author administered reading-related subtests from the KTEA-III (Kaufman & Kaufman, 2014). KTEA-III is a norm-referenced assessment developed to measure the academic achievement of individuals, ages 4 through 25, in the areas of reading, mathematics, written language, and oral language. Overall reliability coefficients for the KTEA-III are reported to be between 0.87–0.95. We used the following subtests phonological processing (untimed), letter and word recognition (untimed), nonsense word decoding (untimed), and word recognition fluency (timed). For students in third grade and above, the decoding fluency subtest (timed) was also administered. We used Form A in February before any tutoring sessions began and converted to standard scores using grade-level winter norms. We used Form B after tutoring sessions concluded (late April/early May) and converted to standard scores using spring/summer grade-level norms.

**Reflective Ability Scoring.** In this study, we defined reflective ability as the ability to justify, evaluate, or extrapolate information from a previous teaching session in the context of a written reflection (Nagro, 2015). SE PSTs' reflections on tutoring sessions were scored at three timepoints (i.e., beginning, middle, end). SE PSTs were instructed to reflect on specific aspects of the lesson, the student's response to instruction, and implications for future instruction. Although feedback on reflective ability was given via an online platform, SE PSTs received full credit for submitting reflection within 48 hours of the tutoring session. We used the reflective ability framework from deBettencourt and Nagro (2019) to score SE PSTs' reflective ability (see Table 2). The reflective ability score was calculated for each timepoint by first coding each sentence within reflections then finding a mean of all sentences within each timepoint.

**Table 2. Rubric for Qualitative Coding**

Scoring	Category	Definition	Example
0	Describe	Concrete statements describing what happened during the lesson	"[The student] did well on segmenting, only struggling on <i>bolt</i> and had trouble with the elision on the word <i>brick</i> ."
1	Analyze	Rationale, reasoning, or justification for teaching moves during the lesson	"[I switched the magnets for wooden blocks because] the manipulatives are less of a distraction and the student focuses more on the activity."
2	Judge	Evaluation of a teaching move by noting the effect of the teaching move on student behavior	"I think [using a piece of paper to cover up a portion of the words] was somewhat effective as [the student] started off with four out of the first five words read correctly."
3	Apply	Determination of how future practice may be altered to improve outcomes based on student response	"I will continue finding words with blended sounds so that she can continue to work on improving."

Adapted from deBettencourt and Nagro (2019)

The average reflection was 21 sentences (range = 11–63). In total, 748 sentences were coded for reflective ability. After three reflections were used to train coders, nine (25%) reflections were scored by two independent scorers and the codes were compared to determine interrater agreement (89.2%).

## RESULTS

### *How Do SE PST Knowledge and Perceptions Change Over Time When Compared to GE PSTs?*

To answer the first research question, pre- to post-test knowledge and perception scores for GE and SE PSTs were compared using a paired samples t-test. For SE PSTs, a statistically significant gain was identified on all four areas of items on the Survey of Reading-Related Knowledge and Perceptions: (a) perceived knowledge, (b) knowledge about foundational skills, (c) dyslexia, and (d) recall of the NRP five. The largest change was observed in knowledge about

foundational skills (Cohen’s  $d = 3.57$  [ $CI_{95}$  2.28, 4.56]) followed by knowledge of the NRP Big five (Cohen’s  $d = 3.08$  [ $CI_{95}$  1.90, 4.27]) and dyslexia knowledge (Cohen’s  $d = 2.61$  [ $CI_{95}$  1.52, 3.20]). The smallest observed gain was on perceived knowledge (Cohen’s  $d = 3.08$  [ $CI_{95}$  1.90, 4.27]). For the GE PSTs, statistically significant effects were found for two areas: dyslexia knowledge (Cohen’s  $d = 1.62$  [ $CI_{95}$  0.78, 2.50]) and perceived knowledge (Cohen’s  $d = 0.80$  [ $CI_{95}$  0.005, 1.60]). Table 3 displays means and standard deviations for each domain on pre- and post-test along with  $p$  values from the paired samples t-test. Table 4 displays percent correct for GE and SE PSTs on all phonemic awareness and phonics knowledge survey items for pre- and post-test.

**Table 3. SE PST Pre- and Post-test Survey Means and Standard Deviations**

	<b>General Education Reading Course</b>	<b>Special Education Reading Course</b>
Sample	Elementary Education (1st–8th grade) $n = 13$	Special Education (Mild/Mod) $n = 12$
Prior Coursework <sup>a</sup>	7 hours ( $n = 13$ )	4 hours ( $n = 12$ )
Pre-Test		
PK	9.77 (1.42)	10.58 (1.83)
Total Knowledge	12.00 (5.03)	13.92 (4.03)
PA Know	5.62 (2.29)	6.50 (2.61)
Phonics/Sp Know	6.38 (3.48)	7.42 (2.84)
Dys Know	2.38 (1.39)	2.08 (0.79)
NRP Big 5	0.31 (1.11)	0.33 (1.15)
Post-Test		
PK	11.00* (1.63)	13.42*** (2.27)
Total Knowledge	13.85 (4.78)	26.08*** (2.64)
PA Know	6.85 (3.00)	11.92*** (1.98)
Phonics/Sp Know	7.00 (3.65)	14.17*** (1.27)
Dys Know	4.23** (0.83)	4.25*** (0.87)
NRP Big 5	0.46 (0.78)	4.33*** (1.43)

<sup>a</sup>Course hours identified through the university programs of study.  
Statistically significant gain from pretest delineated at \*<.05, \*\*<.01, \*\*\*<.001

Table 4. Pre- and Post-Results on Phonemic and Phonological Awareness, Phonics and Spelling Knowledge Survey

Survey Question	Pre		Post	
	GE PST	SE PST	GE PST	SE PST
Phonemic and Phonological Awareness				
A phoneme refers to: <i>a single speech sound.</i>	69%	92%	77%	92%
How many speech sounds are in the word “FIX”?	0%	0%	0%	100%
How many speech sounds are in the word “BRUSH”?	15%	8%	23%	92%
How many speech sounds are in the word “RHYME”?	54%	67%	54%	100%
How many speech sounds are in the word “NATION”?	8%	0%	23%	33%
How many speech sounds are in the word “THROUGH”?	38%	58%	62%	83%
Is the sound /t/ voiced or unvoiced?	23%	25%	23%	67%
Which is a pair of voiced and unvoiced cognates? /ch/ & /j/	31%	17%	38%	58%
Is the sound /th/ clipped or continuous?	31%	50%	77%	92%
Which sound is open and voiced?	15%	17%	8%	75%
A teacher asked her student to put together the parts “cr-ash” orally to form the word “crash”. What specific type of skill is the teacher working on with the student?	15%	50%	23%	8%
If you say the word, segment it into sounds, reverse the order of the individual sounds, and then blend it back together, “ICE” would be: <i>sigh</i> .	62%	58%	46%	75%
If you say the word, segment it into sounds, reverse the order of the individual sounds, and then blend it back together, “ENOUGH” would be: <i>funny</i> .	62%	75%	46%	100%



Table 4. Pre- and Post-Results on Phonemic and Phonological Awareness, Phonics and Spelling Knowledge Survey (continued)

Survey Question	Pre		Post	
	GE PST	SE PST	GE PST	SE PST
Phonological awareness is: the understanding of how spoken language is broken down and manipulated.	31%	25%	62%	58%
Phonemic awareness is: the ability to break down and manipulate the individual sounds in spoken language.	62%	50%	38%	67%
Which of the following is a phonemic awareness activity? Asking a student to segment the sounds in the word cat orally	46%	58%	85%	92%
Phonics and Spelling				
If jetle is a word, the first letter “e” would probably sound like the “e” in: <i>beast</i> .	8%	17%	8%	25%
A combination of two or three consonants pronounced so that each letter keeps its own identity is called: <i>consonant blend</i> .	46%	42%	38%	67%
A “soft c” is in the word: <i>city</i> .	62%	83%	54%	100%
Is the word “RIGHT” regular or irregular for reading? <i>Regular</i>	15%	8%	38%	75%
Is the word “THAT” regular or irregular for reading? <i>Regular</i>	15%	50%	62%	83%
Is the word “SAID” regular or irregular for reading? <i>Irregular</i>	23%	42%	46%	83%
Is the word “SAW” regular or irregular for reading? <i>Regular</i>	31%	50%	46%	75%
Is the word “OF” regular or irregular for reading? <i>Irregular</i>	23%	42%	38%	92%
Is the word “WASH” regular or irregular for reading? <i>Regular</i>	23%	33%	54%	42%

One of the most important steps to teach students to spell the word “STOMP” is to ask students to: <i>break up the sounds in the word and write down letter that correspond to each regularly spelled sound.</i>	77%	92%	69%	100%
One of the most important steps to teach students to spell the word “BUSY” is to ask students to: <i>break up the sounds in the word and recognize which are irregular.</i>	38%	67%	46%	92%
How many graphemes are in the word “SHIP”? <i>Three</i>	38%	33%	38%	92%
How many graphemes are in the word “BLIMP”? <i>Five</i>	23%	8%	8%	83%
How many graphemes are in the word “FIX”? <i>Three</i>	54%	25%	38%	83%
Which of the following words has an example of a final stable syllable? <i>Paddle</i>	0%	8%	0%	42%
Which of the following words contains an open syllable? <i>Bacon</i>	8%	17%	8%	25%
What is the pattern that governs the use of ‘c’ in the initial position for the sound /k/? ‘c’ is used for /k/ in the initial position before a, o, u, or any consonant	23%	17%	23%	92%
What is the pattern that governs the use of ‘dge’ in the final position for /j/? ‘dge’ is used for /j/ in the final position after a short vowel	8%	50%	23%	83%
What research-based instruction does this 3rd grade student’s misspelling of the following words reveal she needs? Student spells volcanick (for volcanic). <i>To understand the regular spelling pattern for the final /k/ sound.</i>	85%	58%	69%	83%

*Note.* The answers are denoted in italics above.

To examine if changes in perceived knowledge or knowledge was differential for GE or SE PSTs, we used repeated measures analysis of variance (ANOVA). Due to the small sample size, Levene’s Test and Box’s M test were checked for normality; on all tests the p-value was greater than 0.05 and equal variances were assumed. We then identified the largest effect, in favor of the SE PSTs, on the identification of NRP Big five knowledge. In addition, we identified large effects, in favor of SE PSTs, on foundational skills knowledge and perceived knowledge. No statistically significant differences were identified in gains on dyslexia knowledge. See Table 5 for full results.

**Table 5. Results from Repeated Measures ANOVA**

Source	SS	df	F	$\eta_p^2$	<i>p</i>
Perceived Knowledge					
Intercept	6253.37	1	1317.66	0.98	<0.001
Gen Ed v. Sped	32.57	1	32.57	0.23	0.015
Error	109.15	23	4.75		
Knowledge					
Intercept	13527.43	1	582.81	0.96	<0.001
Gen Ed v. Sped	625.03	1	26.93	0.54	<0.001
Error	533.85	23			
Dyslexia Knowledge					
Intercept	523.13	1	550.11	0.96	<0.001
Gen Ed v. Sped	0.25	1	0.26	0.01	0.61
Error	21.87	23			
NRP Big 5					
Intercept	92.19	1	69.55	0.75	<0.001
Gen Ed v. Sped	47.39	1	35.75	0.61	<0.001
Error	30.49	23			

*Note.* SS = Sum of Squares, df = Degrees of Freedom, NRP Big 5 = National Reading Panel’s Big 5 components of reading instruction.

***Do SE PSTs’ Post-Test Knowledge Scores Predict Gain in Elementary Students’ Foundational Skills on Standardized, Norm-Referenced Measures?***

To answer the second research question, we used linear regression. We set SE PST’s post-test knowledge score as the predictor and the tutees’ average gain on the KTEA-III subtests as the outcome. The Pearson *r* suggests a strong relation 0.71(CI<sub>95</sub> = 0.09, 0.93) and was statistically significant (*p* = 0.03). However, due to the limited sample (i.e., 9 PST-student dyads) the confidence interval is wide, so the magnitude of effect should be interpreted with caution. See Table 6 for full results across SE PST participants.

Table 6. Tutored Students' Data Pre and Post Tutoring

CORE Phonics										Acadience				KTEA-III			
PST	PA & Phonics Post-Knowledge	ST <sup>a</sup>	Ph_Seg	Ph_Sur	HFV	FSF <sup>c</sup>	PP	LW	NW	WRF	DF <sup>b</sup>						
1	22	Grade 3															
		Pre <sup>c</sup>	5	24	39	—	57	55	63	46	—						
		Post <sup>d</sup>	5	37	43	—	54	52	69	59	—						
		Gain	0	+13	+4	—	-3	-3	+6	+13	—						
		Grade 2															
		Pre <sup>c</sup>	4	20	5	—	78	65	73	56	—						
2	22	Post <sup>d</sup>	7	21	8	—	81	62	71	46	—						
		Gain	+3	+1	+3	—	+3	-3	-2	-10	—						
		Grade 5															
3	22	Pre <sup>c</sup>	10	33	—	—	68	40	61	40	—						
		Post <sup>d</sup>	9	52	—	—	58	41	60	42	—						
		Gain	-1	+19	—	—	-10	+1	-1	+2	—						
4	25	Grade 2															
		Pre <sup>c</sup>	11	68	49	—	—	—	—	—	—						
		Post <sup>d</sup>	13	75	50	—	—	—	—	—	—						
		Gain	+2	+7	+1	—	—	—	—	—	—						
		Grade 3															
		Pre <sup>c</sup>	13	92	80	—	88	77	78	77	78						
5	27	Post <sup>d</sup>	12	115	81	—	97	83	79	83	80						
		Gain	-1	+23	+1	—	+9	+6	+1	+6	+2						

Table 6. Tutored Students' Data Pre and Post Tutoring (continued)

		CORE Phonics				Acadience		KTEA-III			
PST	PA & Phonics Post-Knowledge	ST <sup>a</sup>	Ph_Seg	Ph_Sur	HFW	FSI <sup>e</sup>	PP	LW	NW	WRF	DF <sup>b</sup>
6	27	Grade 2									
		Pre <sup>c</sup>	3	17	11	—	71	68	69	49	—
		Post <sup>d</sup>	10	70	56	—	78	70	86	62	—
7	27	Gain	+7	+53	+45	—	+7	+2	+7	+13	—
		Grade 3									
		Pre <sup>c</sup>	—	106	45	—	59	53	72	51	43
8	28	Post <sup>d</sup>	—	117	47	—	66	55	73	56	75
		Gain	—	+11	+3	—	+7	+2	+1	+5	+22
		Grade 2									
9	28	Pre <sup>c</sup>	11	65	85	—	85	74	82	80	—
		Post <sup>d</sup>	13	98	100	—	108	83	93	94	—
		Gain	+2	+33	+15	—	+23	+9	+11	+14	—
9	28	Grade 3									
		Pre <sup>c</sup>	8	54	91	—	80	77	80	78	82
		Post <sup>d</sup>	12	112	100	—	85	77	79	81	75
9	28	Gain	+4	+58	+9	—	+5	0	-1	+3	-7

10	28	Grade								
		PK	3	1	—	0	—	—	—	—
		Pre <sup>c</sup>	5	7	—	12	—	—	—	—
		Post <sup>d</sup>	+2	+6	—	+12	—	—	—	—
		Gain								
11	29	Grade 2								
		Pre <sup>c</sup>	5	89	99	—	76	83	76	86
		Post <sup>d</sup>	8	110	103	—	87	85	82	108
		Gain	+3	+21	+4	—	+11	+2	+6	+12

*Note.* PP = phonological processing (untimed), LW = letter and word recognition (untimed), NW = nonsense word decoding (untimed), WRF = word recognition fluency (timed), DF = decoding fluency (timed), Ph\_Seg = CORE phoneme segmentation (untimed), Ph\_Sur = CORE phonics survey (untimed), HFW = CORE high frequency word reading (untimed), FSF = Acadience Reading kindergarten first sound fluency measure (timed).

<sup>a</sup>All students were identified with a disability, receiving special education services through the IDEA (2004), and had goals related to reading. Students in 2<sup>nd</sup> through 5<sup>th</sup> grade were receiving specialized pull-out reading instruction in a special education setting. The student in prekindergarten received services in a prekindergarten setting for students identified with a developmental delay.

<sup>b</sup>Only students in 3<sup>rd</sup> grade and above take this subtest

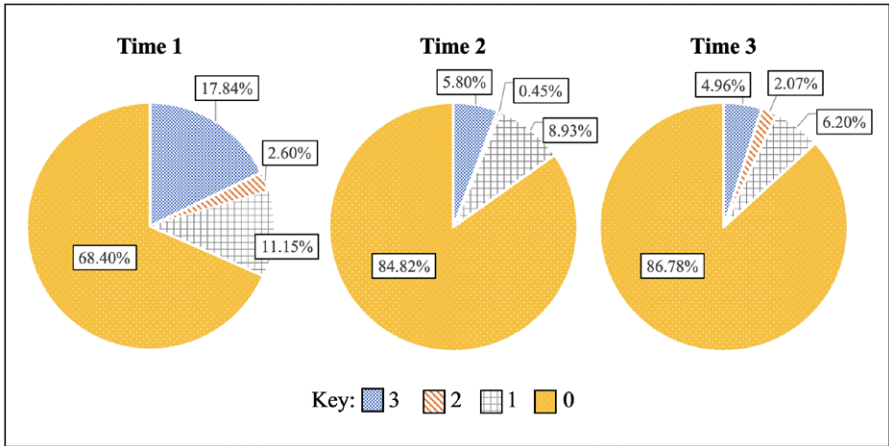
<sup>c</sup>Pre-test for KTEA–III are standard scores from Form A winter grade-level norms

<sup>d</sup>Post-test for KTEA–III are standard scores from Form B spring grade-level norms

<sup>e</sup>This measure was only administered to the tutored student in prekindergarten.

***Does SE Psts’ Reflective Ability Change Over Time? If So, How?***

To address our third research question, we conducted a repeated measures ANOVA. The mean reflective ability differed statistically significantly across time points [ $F(2,22) = 13.20, p < 0.01$ ]. Post hoc tests using a Bonferroni correction revealed reflective ability decreased over time, with a decline between the initial and medial time points ( $0.60 \pm 0.37$  v.  $0.25 \pm 0.16$ , respectively), which was statistically significant ( $p = 0.01$ ). However, the final SE PSTs’ reflective ability mean scores ( $0.23 \pm 0.21$ ) were not statistically significantly different to the medial time point ( $p > .99$ ) but were statistically significantly different from the initial time point ( $p < 0.01$ ). See Figure 1 for SE PSTs’ reflective ability across time and the supplemental files for full results.



**Figure 1.** SE PSTs’ average reflective ability by level across time.

***Does SE PSTs’ Reflective Ability Predict SE PSTs’ Knowledge Gain and/or Elementary Student Standard Score Gains?***

To address our final research question, there was not a statistically significant effect of SE PSTs’ reflective ability mean on SE PSTs’ phonemic awareness and phonics knowledge gain at the  $p < .05$  level [ $F(10, 11) = 0.57, p = 0.79$ ]. Additionally, there was not a statistically significant effect of SE PSTs’ reflective ability mean on elementary student average standard score gain at the  $p < .05$  level [ $F(7, 8) = 84.38, p = 0.08$ ].

**DISCUSSION**

***Main Findings***

In the present study we examined SE PSTs’ knowledge and perceptions of phonemic awareness, phonics, essential constructs for reading instruction



(i.e., NRP five), and dyslexia before and after coursework that was designed to build content and pedagogical content knowledge related to teaching reading to students with a mild to moderate disability. This coursework was paired with fieldwork in which each SE PST assessed and tutored a child in prekindergarten – 5<sup>th</sup> grade with a documented disability. SE PSTs' knowledge was compared with GE peers who were enrolled in their final reading methods course focused on children's literature and writing instruction. Though literacy content during the time of this study was different, GE PSTs had previously taken 2 courses on literacy content, inclusive of one course on foundational skills in the primary grades (first through third grade) and one course on reading strategies for the intermediate grades (fourth through eighth grade). Both sets of PSTs were also engaged in fieldwork in an elementary school setting during the time of the study. We then examined the extent to which SE PSTs' post-test knowledge predicted their tutored students' performance on standardized, norm-referenced measures of reading. Last, we examined SE PSTs' reflective ability over the course of tutoring sessions and whether their reflective ability predicted tutored students' reading performance.

SE PSTs' perceived knowledge and knowledge about foundational skills, dyslexia, and the NRP Big 5 improved significantly from pre- to post-test, and in comparison, to their peers enrolled in a GE literacy methods course. The finding that SE PSTs' knowledge significantly differed from pre- to post-course tests corroborates research conducted and reported by teacher educators (e.g., Al Otaiba and Lake, 2007; Spear-Swerling & Brucker, 2004; Spear-Swerling, 2009) and reinforces the notion that direct instruction of content related to foundational skills is beneficial for PSTs.

GE PSTs, who did not receive direct instruction on foundational skills during the semester of the study, had lower post-test mean percent correct scores on all phonological and phonemic awareness items. A similar pattern was found GE PSTs' knowledge of phonics generalizations and spelling rules in which the pre- to post-test scores for SE PSTs were higher on all items but one (Is "WASH" regular or irregular?). It should be noted that though SE PSTs had significantly higher post-test scores on phonological and phonemic awareness items and phonics items in comparison to their GE peers, there were six items that SE PSTs had a mean percent correct score ranging between 8–42% and only five items were 100%. Items that pertained to syllable types proved difficult for both groups of PSTs. Therefore, even with a semester of both direct instruction and connected fieldwork, there are concepts that PSTs did not master, thus emphasizing Spear-Swerling's (2009) point that one semester is insufficient for PSTs to acquire the necessary content and pedagogical content knowledge to remediate reading deficits for students with an LD in word-level reading.

PSTs' post-test knowledge scores on foundational skills predicted over half of the variance in elementary student standard score growth on the KTEA-III. Moreover, all 9 tutored students with post-test data had positive gains from pre- to post-test on at least one of the KTEA-III subtests. Five tutored students had positive gains in all subtests administered, three in two subtests, and one on one subtest. Similar student gains in foundational skills were reported in Al Otaiba et al. (2012) with GE PSTs who tutored using a code-explicit approach (in contrast to PSTs using a meaning-focused approach) much like the approach SE PSTs in this study employed during tutoring. However, our findings differed from Spear-Swerling (2009) in which she reported that SE PST knowledge did not predict tutored student's gains on measures of phonological and phonemic awareness (Rosner, 1975), letter recognition and decoding, or vocabulary (Diamond & Thorsnes, 2018).

The reflective ability of SE PSTs decreased statistically significantly across time. This finding differs from that of Al Otaiba and Lake (2007) in which they reported SE PSTs' reflections (those who employed code-based tutoring) demonstrated a deeper understanding of code-focused instruction and "was rich in specificity" (p. 605). Al Otaiba and Lake analyzed SE PSTs' reflections using qualitative coding whereas we analyzed using a rubric designed to assess depth and level of reflection. We cannot say for sure why reflective ability decreased over time; however, reflection was a secondary focus of this study. Weekly reflections were assigned with guiding questions as part of coursework and the course instructor provided feedback via the online platform, but reflection or reflective ability was not explicitly taught or modeled as researchers have suggested (e.g., Rogers, 2002). In addition, SE PSTs may not have had sufficient practice opportunities to master the skill of reflection. Last, because PSTs received completion grades for reflections there was no extrinsic incentive to improve in reflective ability. Future work may include repeated in-classroom instructor modeling and practice to acquire a reflective ability and should be accompanied with immediate feedback and instructional coaching (Cohen et al., 2020).

### ***Limitations and Directions for Future Research***

A number of limitations should be considered when interpreting findings. First, our sample size was small and convenient, therefore, findings may not be generalizable. Moreover, the comparison group of GE PSTs received instruction in content that was ideologically and conceptually different from the instruction that SE PSTs received. Therefore, in future research, a larger sample size with the capability to randomly assign PSTs to receive the same content (i.e., foundational skills, evidence-based reading instruction), but with and without a fieldwork component may provide empirical evidence to the additive benefit of a fieldwork component on PST knowledge.

Second, the content and pedagogical knowledge represented in the Survey of Reading-Related Knowledge and Perceptions are examples that have been used on validated surveys (e.g., Binks-Cantrell et al., 2012) but only measure recall of knowledge. Future research may consider including items that require PSTs to apply their knowledge by using data-based decision-making skills (i.e., analyzing student data and making instructional decisions). This aspect of pedagogical knowledge is highlighted as necessary in both the ILA (ILA, 2018) and IDA (IDA, 2018) standards for literacy professionals and is present on teaching licensure exams.

Last, SE PST reflective ability was assessed but not a skill that was targeted through instruction nor emphasized in coursework. Theoretically, reflection is not just an activity but rather part of the meaning-making process that “moves a learner from one experience into the next with a deeper understanding of its relationship with and connections to other experiences and ideas” (Rodgers, 2002, p. 845). As such the ability to be reflective about one’s teaching has become a valued attribute in teacher preparation (e.g., InTASC Model Core Teaching Standards, Council of Chief State School Officers, CCSSO, 2011) and teacher educators have used various practices including written reflection to help engage PSTs in this deeper meaning-making process (Beauchamp, 2015; Griffith, 2017). However, researchers reported without explicit instruction and guiding questions to support a deepening understanding and application of content learned, assignments aimed at reflection may not promote and/or elicit deeper, analytical thinking (Brantley et al., 2008; Hatton & Smith, 1995). Future research would include such conditions with the goal of experimentally testing if guided reflection improves teacher knowledge, behavior, and student achievement. The inclusion of a mixed methods approach in which interviewing is used to capture PSTs thinking, that may not be expressed in written form, may provide more insight into PSTs’ reflective ability.

### ***Implications for Special Education Teacher Preparation***

Though this study has limitations, the findings imply that explicit, direct instruction of content related to the teaching of foundational skills paired with weekly opportunities to apply skills in field-based tutoring is associated with improvement in SE PSTs’ knowledge. However, what is not known is whether PSTs will maintain this knowledge long-term (e.g., during internship, inservice). Therefore, we echo Clark et al.’s (2017) recommendation for teacher educators to measure PST knowledge at strategic points across the preparation program with the goal of assessing what PSTs know, identify instructional gaps, and gain an understanding of how knowledge develops across the program.

Another implication is incorporating tutoring sessions in conjunction with coursework content. Because SE PSTs were matched with an elementary student receiving special education services, they applied the pedagogical and

content knowledge learned in coursework to plan for, rehearse, and implement weekly tutoring sessions. This provided hands-on opportunities for students to have repeated practice (i.e., rehearsal during class, implementation in the field) in teaching foundational reading skills. Furthermore, the incorporation of literacy tutoring has been a long-standing and beneficial practice for PSTs (e.g., Hoffman et al., 2019).

Last, we identified reflection assignments that are not instructor-led, guided, and tied to graded rubrics of reflective ability may not be beneficial. Nagro and colleagues (2017) reported increased reflective ability in PSTs when provided a self-evaluation rubric while writing their reflections and feedback on their reflective ability compared to PSTs who wrote reflections but did not use a self-evaluation rubric or receive feedback on their reflective ability. Because previous research suggests reflective activities are widely used in teacher preparation programs (e.g., Conderman et al., 2005), course instructors should keep these findings in mind when planning assignments that are designed to help PSTs deepen their understanding of content and the connection to teaching.

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***Supplemental File***

***Reading Coursework Completed by SE PSTs and GE PSTs***

Required coursework	Credit Hours	SE PST Mild/Mod EC-12 <sup>th</sup>	GE PST Elem 1 <sup>st</sup> -8 <sup>th</sup>
GE Elementary Literacy	3 hours	X	X
GE Elementary Reading Tutoring	1 hour	X	X
SE Language and Literacy	3 hours	At time of study	
SE Elementary Practicum	1 hour	At time of study	
GE Intermediate Literacy	3 hours		X
GE Literature and Writing	3 hours		At time of study
GE Pre-Student Teaching Practicum	3 hours		At time of study

***Supplemental File***

***SE Language and Literacy Course Sequence (Weeks 1-7)***

Course week	Topics	Tutoring-related activities
1	Reading development, flashcards, and course overview	Pre-assessment survey completed before class
2	Structured literacy compared to typical literacy practices	
3	Assessment administration, oral language, alphabet knowledge	
4	Phonemic awareness, Flyleaf materials training	Grapheme-phoneme correspondences assessed
5	Grapheme-phoneme correspondences, Flyleaf materials training	Student evaluated by SE PST
6	Irregular words, syllable types	
7	Spelling patterns	Tutoring began

***Supplemental File***

**Tutoring Plan and Reflections**

Pre-Service Teacher (PST): \_\_\_\_\_

Setting: \_\_\_\_\_

Cooperating Teacher: \_\_\_\_\_

Grade level: \_\_\_\_\_ Date: \_\_\_\_\_

**List ALL materials needed here:**

**List ALL new/target skills here:**

PA:

Phonics:

Puzzle words:

Objective/Activity	Plan for activity	Notes: Student's response to intervention, observations, reflections, include changes needed for future sessions
<b>Phonemic Awareness:</b> Phoneme blending Phoneme elision  <b>Materials:</b> phoneme mat, chips	Purpose: Segmenting and deleting initial and final blends 1) 2) 3)	
<b>Decoding (phonics): "ck"</b>  <b>Materials:</b> sound-spelling deck, dry erase board and marker, student word list ( <u>attached</u> )	-Review sound-spelling cards -Introduce "ck" as /ck/: 1) 2) 3) -Practice isolated words	

<p><b>Word Chain (phonics):</b> jack, tack, track, trick, trim, rim, rick, pick, sick, sip, slip, slick</p> <p><b>Materials:</b> dry erase board, dry erase marker, Rapid Recognition chart (<u>attached</u>)</p>	<p>Student spells words using procedure below</p> <ol style="list-style-type: none"> <li>1)</li> <li>2)</li> <li>3)</li> </ol>	
<p><b>Spelling (Phoneme-Grapheme Mapping):</b> jack, deck, dock, trick, puck, sock, pluck, plucks</p> <p><b>Materials:</b> dry erase board, dry erase marker, Phoneme Grapheme Mapping work- sheet (<u>attached</u>)</p>	<p>Student spells words using procedure below</p> <ol style="list-style-type: none"> <li>1)</li> <li>2)</li> <li>3)</li> </ol>	
<p><b>Puzzle words:</b> could, said</p> <p><b>Materials:</b> dry erase board, dry erase marker, Rapid Recognition chart (<u>attached</u>)</p>	<p>Review previous puzzle word deck</p> <p>Introduce new words using procedure below</p> <ol style="list-style-type: none"> <li>1)</li> <li>2)</li> <li>3)</li> </ol>	
<p><b>**optional**</b></p> <p><b>Vocabulary:</b> fluttered</p> <p><b>Materials:</b> word and picture cards (<u>Flyleaf</u>)</p>	<p>Introduce vocab w/ steps below:</p> <ol style="list-style-type: none"> <li>1)</li> <li>2)</li> <li>3)</li> </ol>	
<p><b>Decodable reader:</b> “Jack and the Duck”</p> <p><b>Materials:</b> <i>Jack and the Duck</i></p>	<p>Student will read pg 5-11.</p> <p>Questions to monitor comprehension:</p> <ol style="list-style-type: none"> <li>1)p.6 -</li> <li>2)p.7 -</li> <li>3)p.10 -</li> </ol> <p>Correction procedure that will be used for misread words:</p> <ol style="list-style-type: none"> <li>1)</li> <li>2)</li> </ol>	

<p>Assessment</p> <p><b>Materials:</b> Acadience Reading ORF PM#5 teacher and student copy, pencil</p>	<p>Student reads passage for 1 minute Provide following direc- tions: 1) 2) Words Correct: Total Words: Accuracy: WCPM:</p>	
Closure		